Improving Technology & Planned Revisions to Criteria

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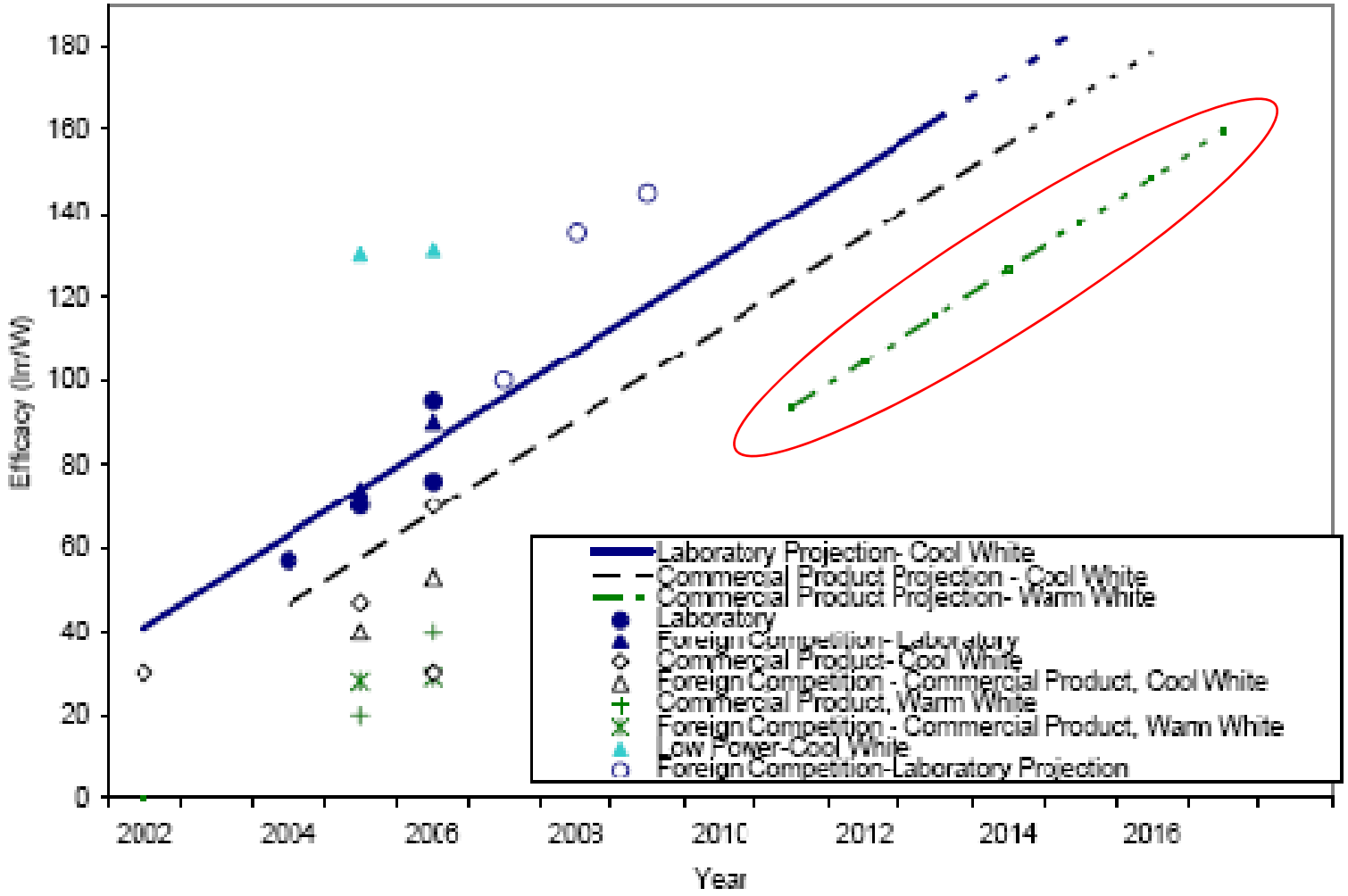
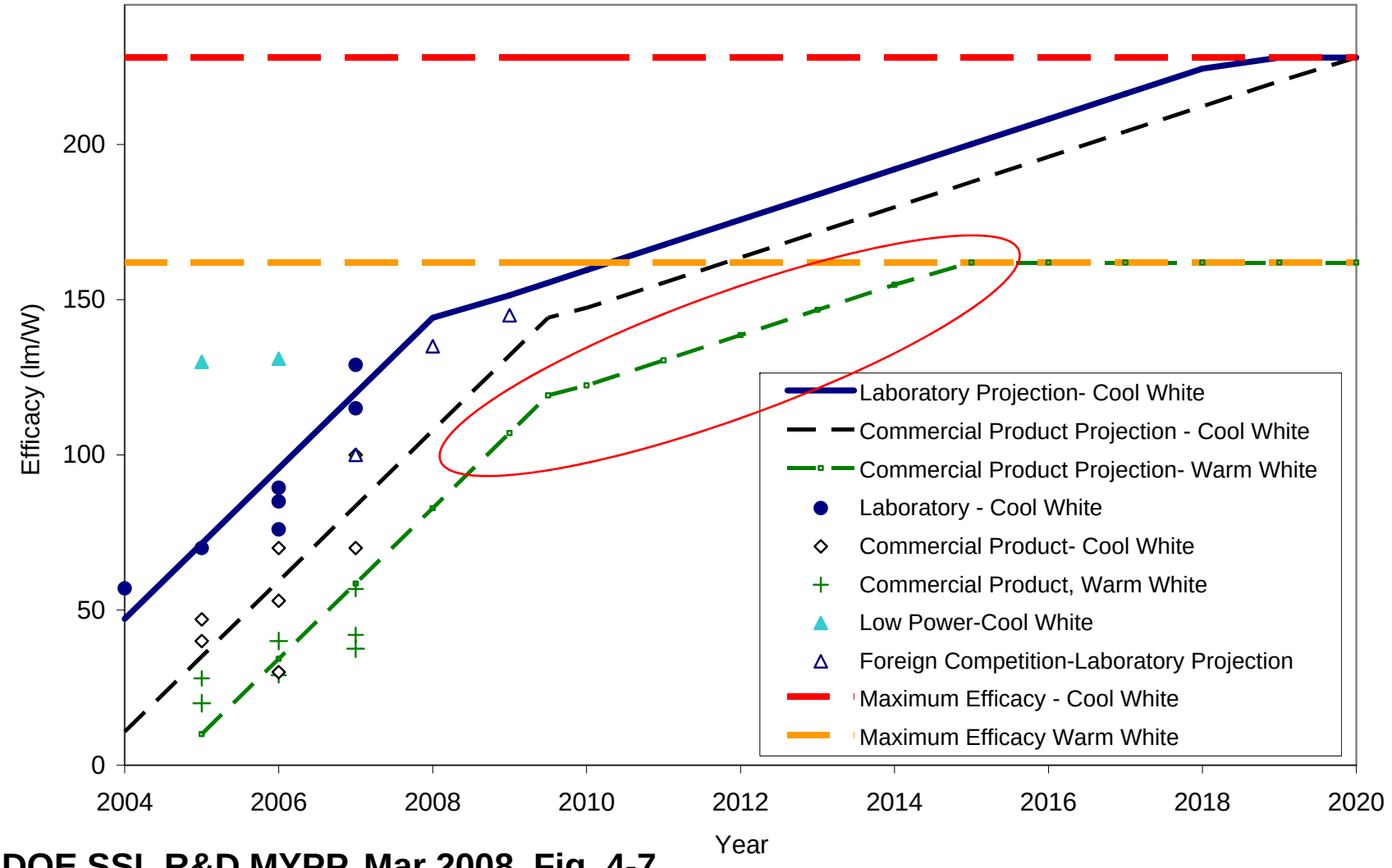
ENERGY STAR SSL Stakeholder Workshop
May 15, 2008

White Light SSL Efficacy, Mar 2007 Targets



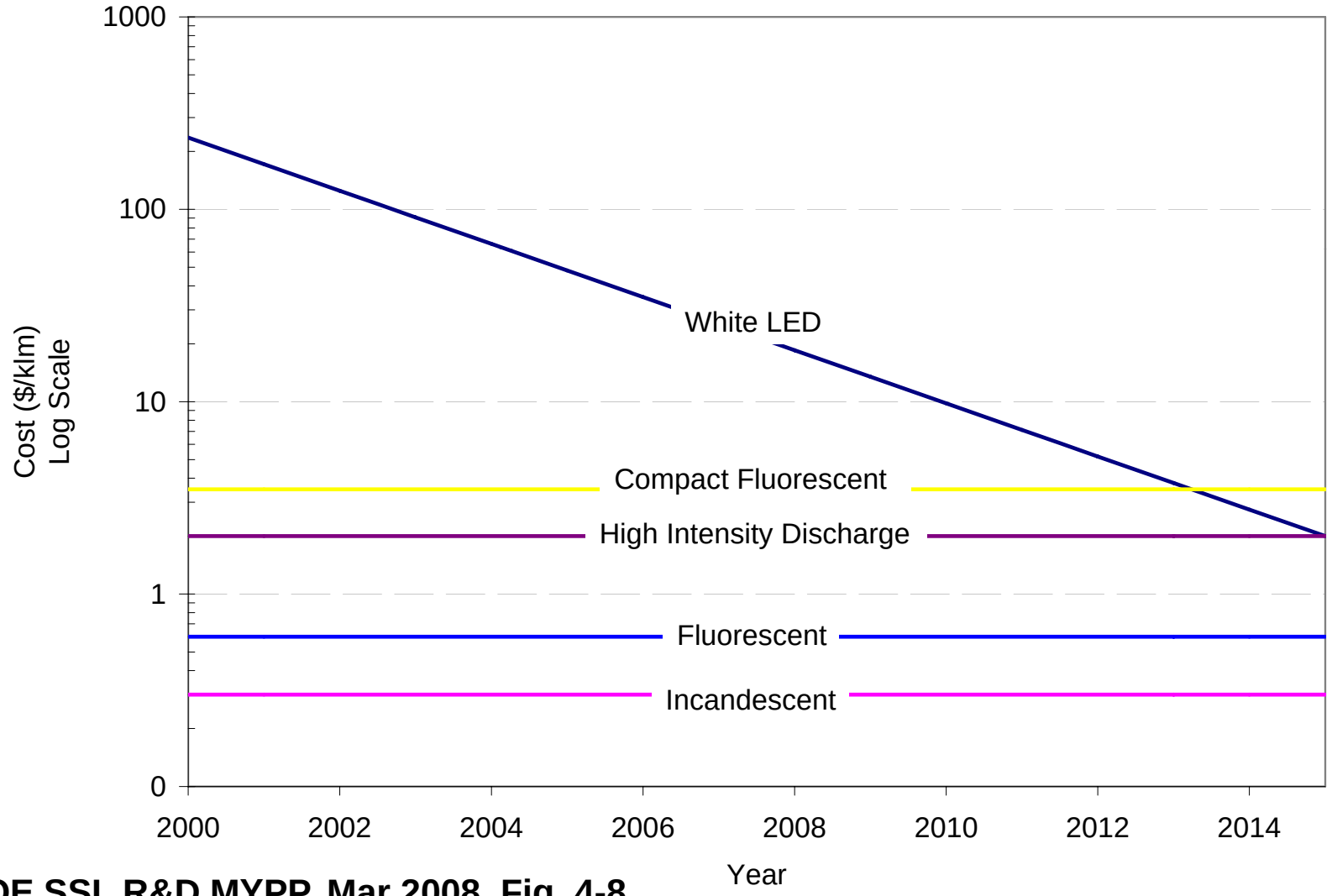
DOE MYPP, Mar 2007, Fig. 4-6

White Light SSL Efficacy, Mar 2008 Targets



DOE SSL R&D MYPP, Mar 2008, Fig. 4-7

White Light LED Device Price Targets



DOE SSL R&D MYPP, Mar 2008, Fig. 4-8

LED Device Performance Projections

Metric	2007	2010	2012	2015
Efficacy-Lab (lm/W)	120	160	176	200
Efficacy-Commercial Cool White (lm/W)	84	147	164	188
Efficacy-Commercial Warm White (lm/W)	59	122	139	163
OEM Lamp Price-Product ($/klm)	25	10	5	2

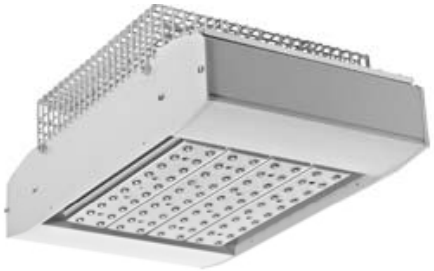
US DOE SSL R&D MYPP, March 2008, table 4-2.

LED Luminaire Performance Projections

Metric	2007	2010	2012	2015
Device Efficacy-Commercial Cool White (lm/W, 25 degrees C)	84	147	164	188
Efficacy-Commercial Warm White (lm/W)	59	122	139	163
Thermal Efficiency	85%	89%	91%	95%
Efficiency of Driver	85%	89%	91%	95%
Efficiency of Fixture	77%	84%	88%	95%
Resultant luminaire efficiency	56%	66%	73%	86%
Luminaire Efficacy-Commercial Cool White (lm/W)	47	97	121	161
Luminaire Efficacy-Commercial Warm White (lm/W)	33	80	101	140

US DOE SSL Multi-Year Program Plan, March 2008, table 4-11.

New, improved products are appearing regularly…



Beta Lighting

Finelite

LLF

Progress

Planned Efficacy Ratchet

- Technology is changing too fast to maintain existing efficacy requirements for extended period
- Given rapid observed and projected efficacy improvements, DOE plans to adopt a schedule of future min. efficacy increases

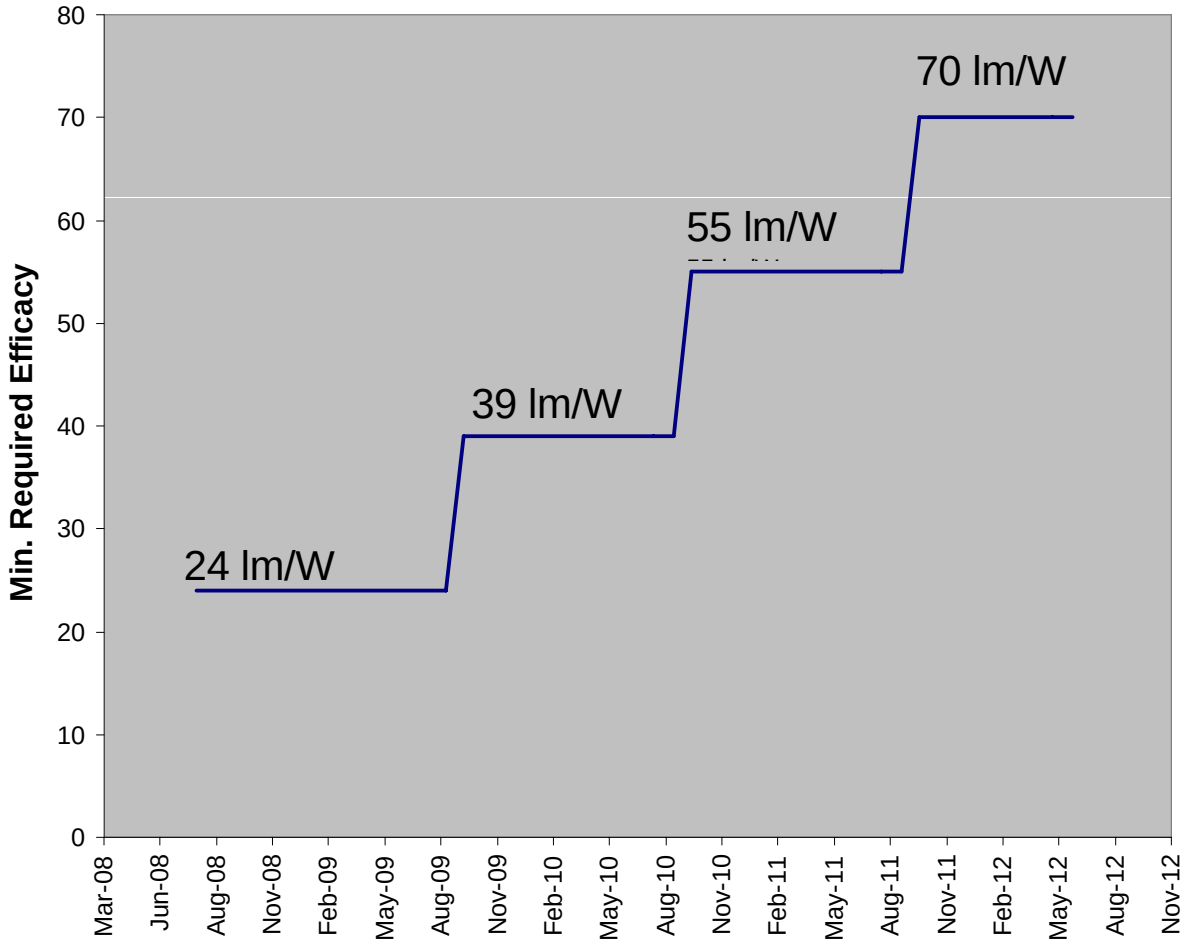
Planned Efficacy Ratchet (cont.)

- Schedule will be published well in advance of effective dates
- Intended to provide manufacturers with clear future map of planned efficacy increases

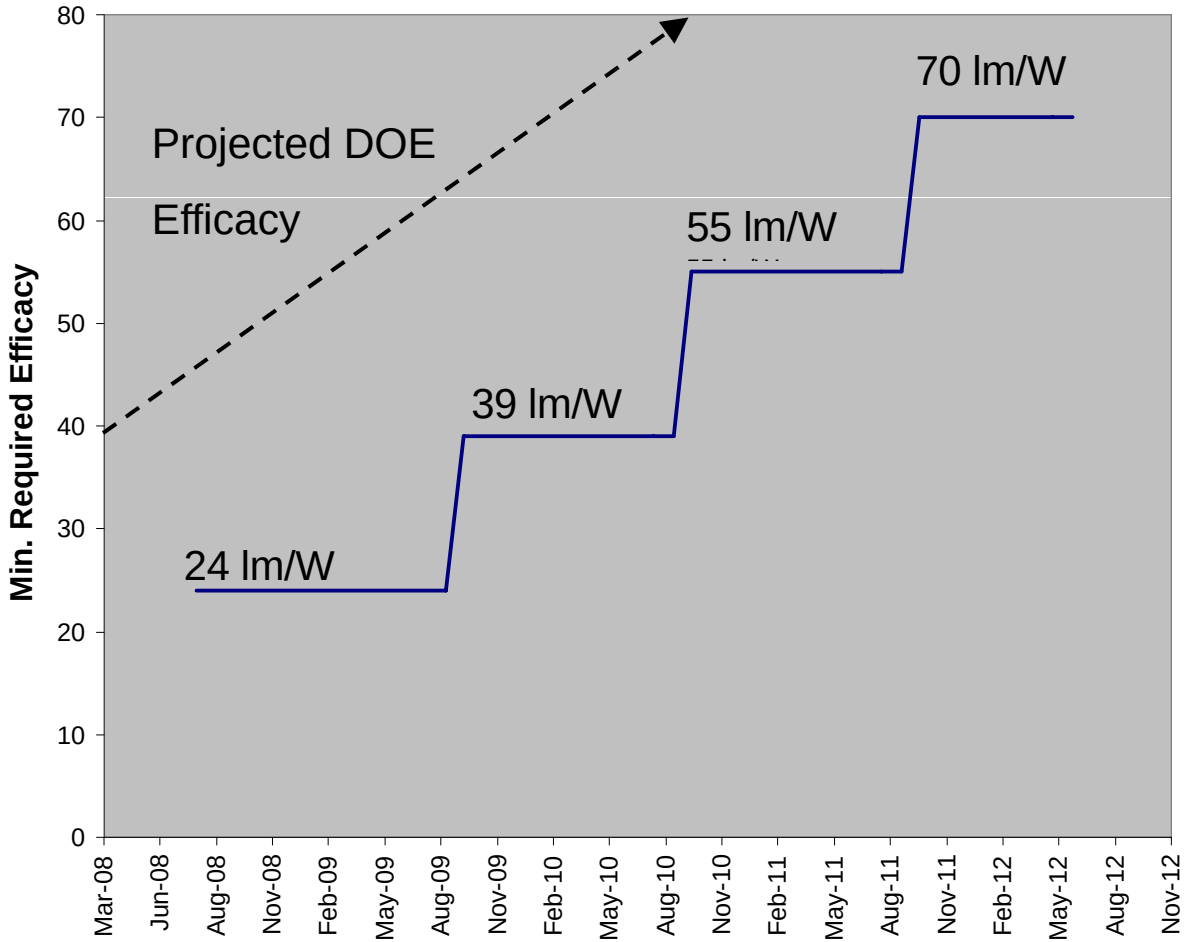
Efficacy Ratchet Method

- For each Cat. A Application, increase min. requirement annually
- Reach 70 lm/W by Sept 30, 2011 (3 yrs. after effective date of criteria)
- Different increases for each application
- All converge at 70 lm/W in 2011

Example: Kitchen Undercabinet Ratchet Schedule



Example: Kitchen Undercabinet Ratchet Schedule



Effect of Ratchet on Qualified Products

- Already qualified products would not have to be retested/re-qualified for 1 year after ratchet increase
- But, **all** qualified products required to re-qualify at least once every 2 years
- Products qualified under different efficacy requirements are all ENERGY STAR; no differentiation; no special designation

Schedule

- Ratchet Schedule announced by July 2008
- Reviewed and adopted by Sept 2008
- First ratchet not activated until Sept 2009
- Annual ratchets thereafter to Sept 2011